





JIM GALE

# Sky

## THE NIGHT

PROTECTING A CULTURAL TOUCHSTONE

BY JOSEPH FLANAGAN

**NIGHT IN NATIVE AMERICA**, when people laid down in the boreal forests of the North, when the tribes of the vast eastern woodlands drifted off to sleep, when the last fires died out in the stone villages of the Southwest, was complete. Above the continent, the darkness was profound, yet bristling with light and mystery, an intense kind of night that seems to have gone the way of the world that slept beneath it.

That sense of infinity at the fingertips, once as much a part of America as its rivers and mountains, is now rare, largely evaporated in only three generations. As our cities consume more and more open land, the night sky has disappeared proportionately, lost in the 24-hour industrial glare of modern life.

**Left:** Seventy miles away, Albuquerque lights up the night south of Socorro, New Mexico.



**Above: Santa Fe.**

Losing the night sky might seem the least of our worries in today's world. And yet a growing chorus of voices, many in the preservation community, is making a case for action: The night sky is a primal element of our human heritage, perhaps the ultimate cultural entity. It is the eternal backdrop to human history, inspiration of thought and belief, source of some of the deepest questions human beings have posed about themselves and their place in the world.

The concept initially bloomed in national parks of the Southwest, where staffers embraced the idea of the night sky as a cultural landscape. "From the Pleistocene to the present, the night sky has influenced the fundamental idea of what it means to be human," says Jerry Rogers, a former top National Park Service official in the region.

The idea expanded into a statewide initiative in New Mexico, where the legislature, prompted by a grassroots alliance that declared the night sky an endangered place, passed a law to preserve it. The New Mexico Night Sky Protection Act—the culmination of an effort launched by a loose confederation of preservationists, astronomers, environmentalists, and the National Park Service—bridged the cultural and natural camps in a way that has inspired others to follow suit.

Listing the night sky as an endangered entity, its value vital to our culture, pushed the boundaries of how we think about place, history, and the human experience. It also required overcoming a lack of public awareness and opposition from powerful forces such as land rights organizations and sign manufacturers.

The Southwest would seem a natural place for the idea. With its open spaces, clear, dry air, and relatively spread-out population, the region still has a lot of dark sky at night. In many of the national parks, petroglyphs and the remains of ancient villages were directly influenced by planetary movements and constellations. The region, a rich field for archeo-astronomy, is abundant with signs left by people whose lives were very much influenced by the order of the universe.

Over the years, the national parks have watched with what Jerry

Rogers calls "growing and helpless dismay" as light sources crept closer and closer: among them growing towns, mining operations, drilling rigs, and refineries. In 1999, the National Parks Conservation Association conducted a nationwide survey of light pollution in the parks, summing up the situation with the title chosen for its report: "Vanishing Night Skies."

### Charting a Course in the Parks

It wasn't that people were completely unaware. Astronomers have long advocated for a clear night sky, as have environmentalists who cite the importance of the dark to the function of ecosystems. The International Dark Sky Association, based in Tucson, works exclusively on the issue.

By the early 1990s, the National Park Service knew it had to tackle the problem, at least in the Southwest. In a 2001 edition of the George Wright Society's *Forum*, Rogers and National Park Service colleague Joe Sovick laid out how formerly isolated parks were no longer immune. "A bright aura above a city might be visible from a park more than a hundred miles distant," they wrote. They also described the increasingly popular practice in rural areas of mounting mercury vapor lights on tall poles to discourage

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thieves. “These streetlights without streets,” they said, “are more statements of modernity than devices for security. They even penetrate Indian country.” So many Navajo residences had mercury vapor lights that “their vast and mostly empty reservations sparkle at night like a thinner suburbia.”

Sovick and Rogers likened park managers to ship captains, responsible for their individual vessels, expecting little help from the outside world. Yet it was at New Mexico’s Chaco Culture National Historical Park, site of the ruins of an ancient metropolis, where some of the first innovations appeared.

Sovick, on temporary assignment as superintendent, heard concerns from staff first hand. What he describes as the “magnificently unspoiled night sky” had been carefully studied by the Chacoans themselves as a blueprint for their builders. The pattern of the universe is integral to the ruins, and therefore part of Chaco’s significance (see sidebar, page 22).

Sovick found that some of the most immediate threats were coming from inside Chaco. Lights at the visitors’ center, on roadside signs, and other features were sending their glare upward. An obvious question followed. How could the park promote appropriate lighting elsewhere when its own lights were causing pollution? Through Bobby Clark, Chaco’s motivated facility manager, the park reoriented its lighting, replacing much of it with shielded, efficient, nonpolluting substitutes. The change made a remarkable difference, illuminating a flaw in the argument of those opposed to curtailing light pollution: the cost of retrofit lights is not as prohibitive as claimed. And Chaco’s electric bill dropped by 30 percent.

Building on Chaco’s success, a regionwide night sky initiative followed. Carlsbad Caverns, Canyon de Chelly, and other parks began reorienting and retrofitting their lighting. There was a new awareness of the sky too. Nighttime interpretive presentations appeared at a host of parks. With the help of

grants, Chaco built a small observatory. The stage was set for action outside the parks.

### The Stars Align

The newly formed New Mexico Heritage Preservation Alliance was at work seeking to protect the State’s history and cultural heritage. The alliance, a citizens’ organization, is like other groups of its kind short on money, time, and personnel. What it had going for it, according to Sovick, was “a precocious energy and a bent for innovation.” It so happened that Jerry Rogers was on the alliance’s committee charged with naming New Mexico’s most endangered places. A discussion between Rogers and Sovick led to the bold idea of nominating the night sky as an endangered cultural place.

Defending the idea meant, in a way, defining the universe. It also called into question the way we have traditionally thought about places deemed worth saving. Writing an early draft of the nomination, Joe Sovick encountered the difficulty of capturing the complex quality of the night sky’s significance. The words “historic” and “cultural,” he wrote, “imply places and things that are created by human hands and meet criteria for the National Register of Historic Places.”

“I have always thought it important to continually press to expand the imagination of preservation professionals,” Rogers says, too many of whom, he believes, are content within the narrow confines of their academic specialties.

In his many years as a preservation official with the National Park Service, Rogers had been involved in a growing trend of honoring the natural world for its cultural importance. Landscape architects were early proponents of the concept, as were anthropologists and tribes. Tracts of land and prominent topographical features were designated as cultural landscapes because of what they meant to the beliefs and traditions of cer-

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# Who Will Keep the Night?

by Angela M. Richman

*No sight that human eyes can look upon is more provocative of awe than is the night sky scattered thick with stars. – Poet Llewelyn Powys*

**WITH ENCROACHING LIGHT POLLUTION**, astronomers travel high atop mountain peaks or send telescopes into space to experience the natural darkness of the night sky. In the Southwest, professionals and amateurs alike may drive hundreds of miles to a national park, where the ancients had only to step outside their door. This is where the initiative to preserve the night sky began.

▮ **WHEN WE LOOK AT THE STARS**, we see the same sky that the ancients saw. The night sky is our best link to those who came before, and though filled in the last century with airplanes, satellites, and the glow of cities, of all the resources on earth it is the one we have the most power to restore. ▮ **THE CANYONS** and the valleys, the buttes and the mesas are alive with the evidence of ancient astronomers, with carved and painted images of the sun, the moon, and the stars. ▮ **AROUND AD 900**, what is now New Mexico's Chaco Canyon National Historical Park bustled with perhaps 6,000 people, archeologists say, with thousands more passing through. They built roadways extending hundreds of miles. They erected homes and buildings, both public and religious, with hundreds of rooms. They farmed the land and worried about what they were going to eat. At night they sat under an immense sea of stars and pondered what they saw. And they left many clues to how they tried to give order to the seeming chaos in the sky. ▮ **ATOP FAJADA BUTTE**, a beacon for travelers that can be seen 40 miles away, is a solar marker known as the "sun dagger." Three sandstone slabs lean against the cliff face, above two carved spirals strategically placed to interact with the sun. On the summer solstice, when the sun reaches its highest point around noon, the three slabs project a dagger of light bisecting the larger of the two spirals. Similar scenes unfold at the winter solstice and vernal and autumnal equinoxes, with daggers of light in a pattern dance with the spirals. These daggers of light marked not only the time of year, but the time of day as well. They indicated when to plant, harvest, hunt, and the timing of ceremonies. ▮ **FROM THE FIRST SLIVER OF LIGHT** to the last, the daggers quickly make their mark, giving those privileged to witness the event the sensation of a moving planet. We can be sure the magic was anticipated year after year. ▮ **JUST SEVEN MILES WEST** is a pictograph of a handprint, a crescent moon, and a starburst, deliberately sheltered from weathering. Some believe it records a dramatic celestial moment. ▮ **IN AD 1054**, at the height of the Chacoan civilization, a supernova blazed across the sky, lighting up the night. Perhaps it scared them a little, interpreted as a sign from the gods or an omen of change. And on the first and brightest day, a crescent moon was the supernova's close companion in the heavens. The handprint might be the artist's signature. ▮ **NOT FAR AWAY** is an even more powerful symbol—three concentric rings with a large tail of red paint. In AD 1066, only

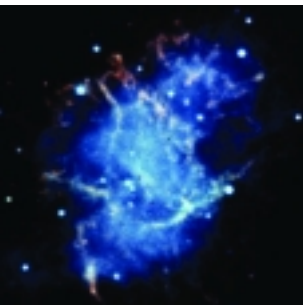
12 years after the supernova, Halley's comet visited the skies of New Mexico. So the same person could have recorded both events. How sad it would be if such a rare and spectacular event happened today and the people on our planet were not be able to bear witness. ▮ **THE CHACOANS** took inspiration from the stars. Many buildings align directly north-south or east-west.

Archeologists suggest that the North Star guided the layout of the civilization. Doorways faced north, orienting one from the threshold of home to any point on the compass.

▮ **HIDDEN IN** the rock shelters of Arizona's Canyon de Chelly National Monument are what archeologists first called ancient planetariums; a better word would be star ceilings, some created with arrows dipped in paint and shot aloft. Like a planetarium, these spaces displayed the stars during the day, probably as a set for storytelling. We can never be sure of the purpose, but we do know that the Navajo created the ceilings, and most of their rituals were performed for protection. ▮ **THE NAVAJO** also used star patterns to symbolize moral codes. The Fire Star (North Star), Revolving Male (Big Dipper), and Revolving Female (Cassiopeia) illustrate how life should be lived in the hogan, with the constellations revolving around each other and a center fire. ▮ **THE DILYÉHÉ** (the Pleiades star cluster) signalled when to plant crops. When the cluster is no longer seen in the evening sky, crops can be planted without threat of frost. Conversely, when the cluster is seen in the morning, it is too late to plant. Hunting season begins with a signal from the tail of Scorpius, known as the rabbit tracks. Modern Puebloans believe that the night sky is important not only to connect to past generations, but also to teach the children of today. ▮ **WITH TECHNOLOGY**, astronomers have been able to look deeper into space and, therefore, farther back in time. Aware of the importance of the night sky to visitors, the National Park Service launched a project to measure light pollution in the parks, which became known as the Night Sky Initiative. Some parks, like Petroglyph National Monument just outside Albuquerque, have largely lost the night sky experience. Others throughout the Southwest face a serious threat. Satellite images show the increase in light pollution over the last 40 years; in another 20, the effect could be disastrous. ▮ **WE HAVE** long recognized the importance of sites like the sun dagger and the star ceilings. By preserving these places, we preserve a part of the people who made them. Where most people live we have already lost the pristine sky. It is imperative to keep at least a few places to be inspired. There is hope; we haven't completely lost this piece of who we are.

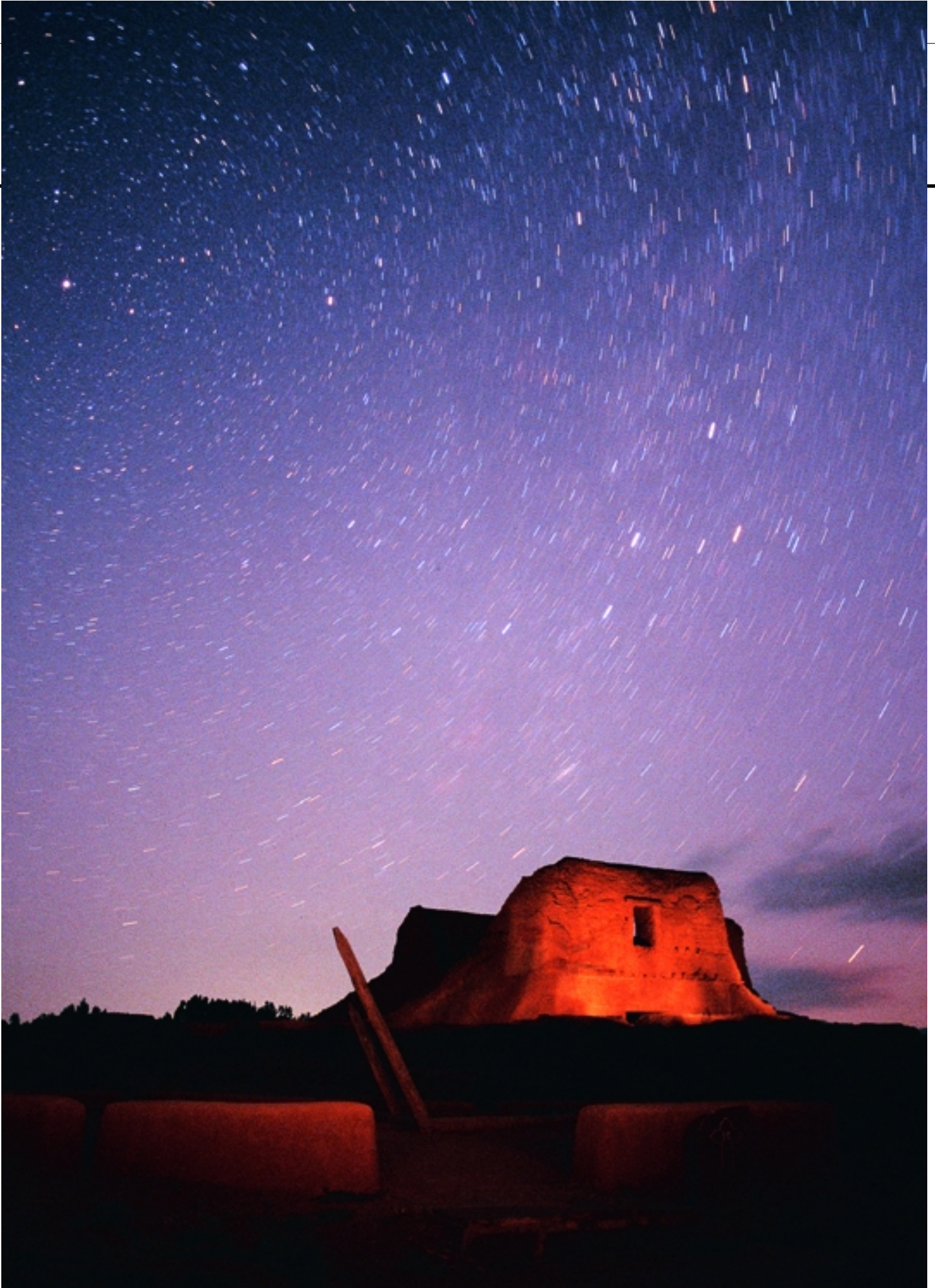
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**Right:** Hale-Bopp Comet over Chaco's Fajada Butte; **Below:** The ruins, the observatory, and shots through the telescope.



ABOVE: MARKO KECMAN; LEFT: CHACO CULTURE NATIONAL HISTORICAL PARK





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tain groups. If people had difficulty grasping the night sky as a cultural entity, proponents were ready to support the idea with a well-established precedent.

When the alliance released its first list of New Mexico's most endangered places in 1999, the night sky was on it. The novel idea caught on quickly with the press and an informal coalition began to take shape. Astronomers and environmentalists applauded, while wilderness advocates, tribes, the National Parks Conservation Association, and even some developers got behind the concept. Op-ed letters in the newspapers added to what became a growing awareness.

Night sky proponents soon turned their focus to the legislature. On the surface it seemed a stretch in a region where land use issues are delicate and divisive. The myriad voices made a persuasive argument: Less than 10 percent of the population, nationwide, could see the Milky Way. Two-thirds of our national parks could no longer offer the experience. New Mexico was losing one of its most unique features, the ability to look into the same sky the ancients saw thousands of years ago, with the sense of a spiritual link between our world and theirs.

New Mexico State Representative Pauline Gubbells introduced a bill in early 1999. Sovick worked with her on the draft and testified at committee hearings using Chaco as the example. Even with opposition from the outdoor advertising

industry and various land rights organizations, the bill passed. Then-Governor Gary Johnson, persuaded by the benefit that such a law could yield at a low cost and virtually no regulatory burden, signed it into law in April 1999.

### Taking Back the Night

The law requires outdoor lighting to be shielded and directed downward (rather than upward or laterally, which is not only polluting but wasteful). Mercury vapor lights, one of the greatest sources of light pollution, can no longer be sold in the State. Though inexpensive to buy and install, the lights are costly to operate and 50 percent of the illumination goes skyward at a wasted angle. The law says that as they wear out they are to be replaced by non-polluting alternatives.

Cities and towns across the State whose street lights are among the primary sources of glare will be required to make changes. Local communities can adopt stricter ordinances if they see fit.

As always, compromises had to be made. Ranches, farms, and the outdoor advertising industry are exempted. There is also no enforcing entity, so the job of educating the public is still largely

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done by night sky advocates. It is a start, however—a foundation for future action in New Mexico and beyond. The coastal Long Island town of East Hampton, New York, recently adopted a night sky ordinance based on cultural values, and Connecticut has enacted a law as well.

For its part, the National Park Service continues to benefit from its night sky education effort and the partnerships it has fostered, an experience that serves as a blueprint for others. Meanwhile, its own night sky work continues to gain momentum.

Park interpretive programs addressing the night sky continue to expand and many parks, including Yellowstone, are beginning to retrofit outdoor lights. Recently, the National Park Foundation has also become active. Through the foundation, Musco Lighting, an Iowa firm that specializes in illuminating sports venues, is retrofitting the outdoor lights at Canyon de Chelly. The National Park Service's Denver Service Center is also paying special attention to lighting in facility design.

Quantifying light pollution in parks—and progress to curtail it—is essential. In 2000, the National Park Service Night Sky Team was established. Led by Chad Moore and Dan Duriscoe, the group is developing a measurement system. The team also offers assistance in the form of public outreach and evaluation of existing lighting.

While governor of New Mexico, Johnson declared August 12 "Dark Sky Appreciation Night." Recalling the nightscape seen by the mammoth hunters of the Clovis age and Vasquez de Coronado on his explorations, he urged the public to "turn out the lights, go outside, and enjoy the blessings of an unspoiled night sky."

**Left: New Mexico's Pecos National Historical Park.**

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